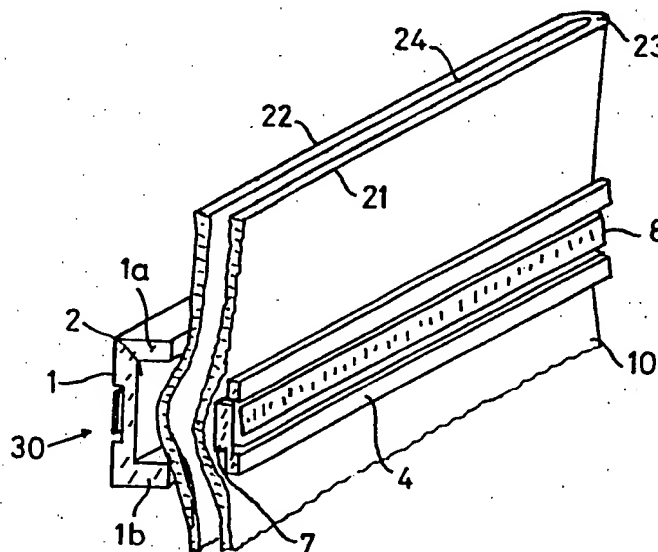




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(54) Title: DEVICE TO CLOSE SACKS



## (57) Abstract

A sack closure device which includes a first member (1) having a longitudinally extending recess, a second member (4) receivable in the recess, and releasable clamping means (8) to hold the members together. One of the members can be pre-attached to the external surface of a sack neck i.e. prior to the sack being filled. In an alternative embodiment, the members can be retained about the neck of a (filled) sack by a strap forming the clamping means i.e. with a neck part held between the members; the device(s) components can then be stored separately from the sack(s), as can the device components.

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## DEVICE TO CLOSE SACKS

## FIELD OF THE INVENTION

This invention relates to the technical field of reclosable sacks and closure device and method, and in particular to 5 undamaged reclosable paper sacks and re-usable closure device and method.

## BACKGROUND TO THE INVENTION

Sacks are widely used in commerce, typically for storing and transporting flowable particulate solids; the sacks have at least 10 one opening or mouth through which the sack can be filled and emptied; in use therefore a sack has a body portion which contains the flowable solid, and a neck portion which is free or substantially free of flowable solid, with the neck portion terminating in an open mouth defined by a free terminal edge of 15 the sack material; as is well understood the extent of the respective body and neck portions for the sack depends upon the height to which the sack has been filled.

Sacks of various grades of paper (herein referred to as "paper sacks") are commonly used to pack tea, dessicated coconut, wheat 20 and flour, sugar, cement and other foodstuff and non-foodstuff granules and powders of all kinds; the paper sacks are flexible

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and can for instance conform to the shape of adjacent sacks when being stacked, or to the shape of a handler's shoulder when being carried.

A problem common to all sacks used to store or transport  
5 particulate solids is properly to seal the sack neck so that the contents cannot inadvertently flow from the mouth and/or be consumed by vermin e.g. sacked corn in transit, in storage, or after sack opening pending use as by a miller or farmer. Another problem is the cost of the sacks, even when made of reconstituted  
10 wood fibres, with sacks damaged as they are opened not being re-usable for their intended purpose.

#### STATEMENT OF THE PRIOR ART

Paper sacks traditionally have the portions defining their neck held (a) by paste or adhesive applied to the facing (inner) neck  
15 surfaces, with the surfaces held together until the paste sets, or (b) by a heat-responsive adhesive, with the sack facing surfaces to which the adhesive has been pre-applied again being held together by heated bars until the adhesive has been cured. The use of such techniques allows the internal facing surfaces to  
20 be secured along their complete length.

Mechanical intermittent connecting means such as stitching is also used, with unsecured gaps between the stitches. Stapling is also used, but with larger unsecured gaps than with stitching,

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and snap and equivalent closures such as that of DOS 2845526 have also been suggested. Sack-sized bag closures such as those of European Patent Application 0029270 (for plastic bags) with a section inwards of the facing surfaces have also been suggested; 5 closures so mounted have the additional disadvantage of perhaps being ripped free as the contents are poured from the sack.

Further general problems of the above teachings are that often either (a) the paper sack is damaged on the making or the release of the connection, or (b) if the connection is too difficult to 10 release, the sack is perhaps cut below its mouth (to permit removal of the closure, or allowing access to the sacked contents whilst leaving the closure in place but inoperative), with the sack contents if not immediately emptied being open to attack by vermin and the like. In both instances the sack cannot be 15 re-used for its intended purpose.

It is also known to provide a mechanical connection involving prior folding of the bag neck. Examples are taught in German Patent 966,277 and German Patent Application 1,012,161. Whilst the folds provide full length neck sealing, fitting the 20 connection is time consuming and can require significant skill and manual dexterity to ensure level folds as well perhaps as significant finger strength (especially if the sack includes an internal liner e.g. a waterproof inner lining). The connection has to embrace several thicknesses of paper; furthermore it has 25 to meet conflicting requirements in that it has to be deformable

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to make the connection and to permit subsequent break of the connection, but also it has to be substantially non-deformable to sustain the connection during transit and storage.

#### DISCLOSURE OF THE INVENTION

5 In accordance with one feature of the invention we provide a sack closure device which includes a first member having sheet material deforming means, a second member having deformed sheet material receiving means and a third member adapted to hold the first and second members together. Preferably the sheets  
10 deformed by the first means are held between the first and second means in close sealing contact.

In accordance with another feature of the invention we provide a sack closure device which includes a first member having a longitudinally extending recess, a second member receivable in  
15 the recess, and releasable clamping means to hold the members together.

Preferably the first member is of U-shape in cross section, with an arm to either side of the recess, each arm being adapted to engage the sack neck externally of the sack, with one arm  
20 nearer the mouth than the other. Usefully the first member will be of a length equal to half the length of the terminal edges defining the mouth, but in a first alternative embodiments can be slightly longer, and in a second alternative embodiment slightly

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smaller.

Preferably the second member is a plate, which can fit into the recess between the arms of the preferred embodiment of the first member. The second member will be of a length similar to that of  
5 the first member and in the preferred embodiment will be of a length equal thereto.

Both the first and second members can be rigid and substantially non-flexible or non-pliable.

In accordance with yet a further feature of the invention we  
10 provide a method of closing a sack neck characterised by trapping neck parts between first and second members, one of the members having a recess and the other of the members having a projection, and holding the members together. The members are thus held with the sack neck therebetween, and are held together by the strap  
15 notwithstanding that the members are physically separated in use.

In one embodiment and prior to filling of the sack the first member is pre-fixed to the outside of the sack, at the anticipated neck position or close to it, as by adhesive; the  
20 second member (which in this embodiment is removable from the sack) is placed in an opposed position so as to permit the neck part to be deformed between the members when these are squeezed together. In a first but less preferred alternative embodiment

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the second member is pre-secured to the outside of the sack, with the first member being removable therefrom.

In a preferred embodiment however the first and second members are coupled together in use but neither is fixed irremovably to the bag, so that both will be removed upon bag opening. Thus they can be re-used to re-seal that sack, or to seal another sack.

Usefully the second member is a plate, which can fit into the recess between the arms of the preferred embodiment of the first member. Thus the members can themselves be stored together (when not in use) in compact array.

Preferably the releasable clamping means is a strap, of a length greater than the terminal edges whereby in use to embrace the first and second members. The strap can be of a heat-fusible material, which is severed when the sack is to be opened, and replaced when the sack is to be re-used and utilising a special heat sealing tool; an advantage of this arrangement is that if the strap is released without authority and the contents tampered with, then this is usually readily apparent upon delivery. Alternatively the strap can carry a known buckle, allowing release and re-use of the strap.

Both the strap (and buckle) will usefully be designed to lie flat, to provide a flat-lock. The second member can be recessed



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or-grooved on its outer face in use to locate the strap (and buckle) to prevent these being inadvertently damaged when fitted.

One or both members can have end slots or notches, to locate  
5 the strap against lateral slippage (towards and away from the mouth in use). The second member can include apertures which in different arrangements (a) impart some flexibility to the second member, so that this can better conform to the adjacent external  
or outside surface of the neck; (b) permit strap retention, with  
10 the strap being led or intertwined therethrough; and (c) provide location positions for a releasable buckle.

We also provide a sack pre-fitted with one of the first and second members.

We further provide a sack having a body portion and a neck  
15 portion, the first and second members being squeezed together with a part of the sack neck therebetween, and the members being held by a releasable retention member.

#### SHORT DESCRIPTION OF THE DRAWINGS

This invention is described below by way of example only, with  
20 reference to the accompanying drawings, in which :-

Fig.1 is a side view of a sack fitted with a closure device

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according to the invention;

Fig.2 is a perspective view, partly cut away, of a closure device according to the invention fitted to a sack neck;

Fig.3 is an exploded perspective view of an alternative embodiment of closure device according to the invention.

#### DESCRIPTION OF THE EXEMPLARY EMBODIMENTS

As seen in Fig.1, sack 10 has its neck 20 held closed by a reclosable device 30. Device 30 is of lesser width than length, with its longitudinally extending dimension substantially parallel to the mouth 24 of sack 10.

As seen in Fig.2 the reclosable device 30 comprises a first member 1, a co-operating second member 4, and a third or holding member 8. As will be further described below, in this embodiment the device components are all re-usable; in the embodiment of Fig.3, though the first and second members are re-usable (and replaceable), the third member 8 is replacable but not re-usable.

First member 1 is a backing strip made of a hard, non-pliable material, with a longitudinally extending groove 2 in one side so that it is generally of U-section, with in its position of use forwardly facing arms 1a,1b. In use, the arm 1a is nearer the mouth 24 than the arm 1b.

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The second member 4 is of longitudinally extending plate form, and in this embodiment is itself sized and shaped to fit in groove 2 of first member 1, specifically between the arms 1a,1b and thus as an insert in the groove. Thus the first and second 5 members can be stored compactly when not in use.

Second member 4 has an integral projection 7 on one side, which in its position of use faces groove 2 with paper sheeting 21,22 trapped therebetween. Paper sheeting 21,22 is joined as at 23 whereby to form a sack 10 with a neck 20 terminating at open 10 mouth 24.

The device also includes strap length 8, which can be pulled tight and its ends connected. In the embodiment of Fig.2 the strap length is first tensioned, and then its ends are heat-sealed together, so that the strap needs to be cut or 15 otherwise severed to release the first and second members. In an alternative embodiment the strap ends are held by a releasable clamp such as a buckle, and the strap can then be reused; to indicate possible unauthorised sack opening during transit, a tag can be fed around buckle parts such that the tag, conveniently a 20 thin plastics tag of the type used in stores on goods for sale, needs to be cut before the buckle can be released.

In the embodiment of Fig.3, first member 101 has a notch 3 at each end to help locate strap 8. Second member 104 has a notch 5 at each end for a similar purpose.

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Second member 104 has apertures or slots 6 partway along its length. A number of protuberances 107 (with only the end of one being visible) are positioned between apertures 6. In an alternative but less preferred embodiment, second member 104 has 5 a single protuberance, near its centre.

Although the embodiment of Fig.3 can be placed upon or held against the sack mouth 20 after sack filling, as has been suggested for the embodiment of Fig.2, we prefer in use the first member or backing strip 101 to be fixed as by being pasted or 10 adhered to an outer surface of sack neck 20 during or following sack manufacture.

After the sack 10 has been filled its open ends are placed together and the second member 104 is placed on the paper sack 10, being positioned opposite the groove 102 of the backing strip 101. The strap 8 is passed through the notches 5 and the notches 15 3, and around the backing strip 101. Thus the strap 8 encompasses the backing strip 101 and the insert 104 and the open ends of the paper sack 10. In an alternative embodiment the strap 8 is passed through the slots 6 to form a sub-assembly prior to insert 104 20 being placed on sack 10.

The strap 8 is then pulled tight and tensioned so that the sheeting forming the open mouth ends of the paper sack 10 is forced into the groove 102 of the backing strip 101. The

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protuberance(s) 7 on the insert 104 pushes and forces the walls of the paper sack 10 into the groove 102 of the backing strip 101. The strap 8 is tightened and secured by a clamp 9, or heat sealed.

- 5 The device forms an efficient closure which locks the open ends of the paper sack 10.

The paper sack 10 may be opened by cutting the strap 8, and it may be closed again as described above by replacing the cut strap with new strap.

- 10 Amongst the advantageous features of the Fig.3 embodiment of this invention as described are that it (a) provides a simple and effective closure for a paper sack; (b) provides for the paper sacks to be opened simply and quickly by cutting the strap; (c) enables the paper sack to be reused many times by replacing the  
15 strap only. The paper sack and the first and second members can be reused many times over, and only the strap has to be replaced.

With the Fig.2 embodiment, with the strap not cut or severed, both the sack and the device can be re-used.

- 20 The invention may be used commercially by (a) making the devices and selling these to be used with paper sacks, and (b) fixing the device or a part thereof onto the paper sack upon

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manufacture of the paper sack, and selling the complete paper sacks with the reclosable device.

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## CLAIMS

1. A sack closure device characterised by a first member having sack sheeting deforming means, a second member having deformed sack sheeting receiving means and a third member adapted to hold the first and second members together.
2. A sack closure device characterised in that the first member has a longitudinally extending recess, and in that the second member has a protuberance receivable in the recess whereby sack sheeting deformed by the first means is held between the first and second means and in close sealing contact therewith.
3. A sack closure device according to claim 2 characterised in that the second member is itself receivable in the recess.
4. A sack closure device according to claim 1 characterised in that one of the members is secured to an outside surface of the neck of a sack.
5. A sack closure device according to claim 1 characterised in that the third member is a releasable clamping strap.
6. A sack closure device according to claim 1 characterised in that the third member is a severable clamping strap.

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7. A sack closure device according to claim 1 characterised in that the first and second members each have longitudinally extending recesses in surfaces opposed respectively to said sheeting deforming means and said sheeting receiving means, said recesses being sized to locate said third member, said third member being a non-extendable strap.
8. A sack characterised in that a sack closure device according to any of claims 1-7 is fitted about a neck part of the sack.
9. A sack characterised in that one of the first and second members of a sack closure device according to any of claims 1-7 is secured to a neck part of the sack.
10. A method of closing a sack neck characterised by trapping neck parts between first and second members, one of the members having a recess and the other of the members having a projection, and holding the members together.



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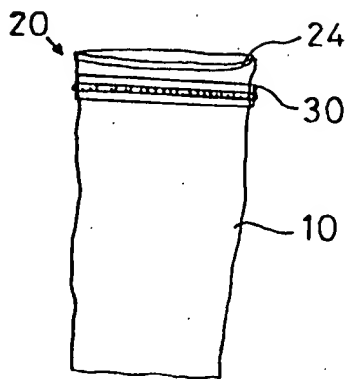


FIG 1

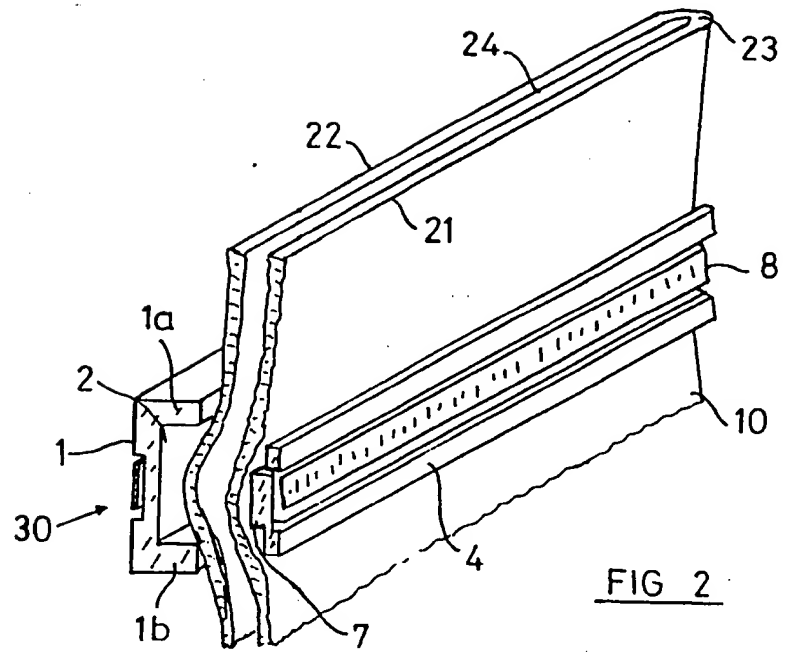


FIG 2

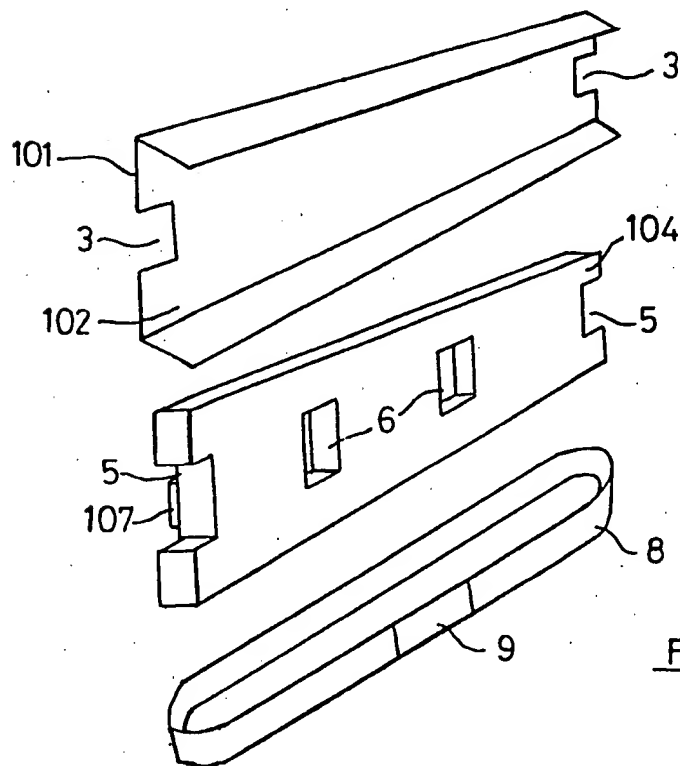


FIG 3

## INTERNATIONAL SEARCH REPORT

International Application No.

PCT/LK 92/00001

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all)<sup>6</sup>

According to International Patent Classification (IPC) or to both National Classification and IPC

Int.Cl. 5 B65D33/16

## II. FIELDS SEARCHED

Minimum Documentation Searched<sup>7</sup>

| Classification System | Classification Symbols |
|-----------------------|------------------------|
| Int.Cl. 5             | B65D                   |

Documentation Searched other than Minimum Documentation  
to the Extent that such Documents are included in the Fields Searched<sup>8</sup>III. DOCUMENTS CONSIDERED TO BE RELEVANT<sup>9</sup>

| Category <sup>10</sup> | Citation of Document, <sup>11</sup> with indication, where appropriate, of the relevant passages <sup>12</sup> | Relevant to Claim No. <sup>13</sup> |
|------------------------|--|-------------------------------------|
| A<br>X                 | DE,C,964 570 (KLEIN-SOETEBIER) 23 May 1957<br>see the whole document<br>----                                   | 1<br>10                             |
| A                      | US,A,4 177 919 (SOTO) 11 December 1979<br>see column 3, line 25 - column 4, line 57;<br>figures 1-9<br>----    | 1                                   |
| A                      | CH,A,464 781 (ROCCHISIANI) 13 December 1968<br>see the whole document<br>----                                  | 1                                   |
| A                      | WO,A,8 707 240 (KROMAN) 3 December 1987<br>see abstract; figures<br>----                                       | 1                                   |

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## IV. CERTIFICATION

Date of the Actual Completion of the International Search

29 MAY 1992

Date of Mailing of this International Search Report

2 JUN 1992

International Searching Authority

EUROPEAN PATENT OFFICE

Signature of Authorized Officer

NEWELL P.G.

Newell

ANNEX TO THE INTERNATIONAL SEARCH REPORT  
ON INTERNATIONAL PATENT APPLICATION NO. LK 9200001  
SA 57610

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report.  
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| US-A-4177919                              | 11-12-79            | US-A- 4102487              | 25-07-78            |
| CH-A-464781                               |                     | None                       |                     |
| WO-A-8707240                              | 03-12-87            | AU-A- 6846990              | 14-03-91            |
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